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SECOND BI-MONTHLY PROGRESS REPORT
UNIVERSITY OF ALASKA
ERTS PROJECT 110-13

December 13, 1972

A. TITLE OF INVESTIGATION:

Glaciological and Volcanological Studies on the Wrangell Mountains, Alaska

B. PRINCIPAL INVESTIGATOR/GSFC ID:

Carl S. Benson

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C. PROBLEMS IMPEDING INVESTIGATION:

1. The locations of aerial photographs taken with the NASA NP3A aircraft on 21 July 1972 were not accurately given in the camera correlation log. Also, the camera was turned on late in one data run across the summit; this resulted in no side-lap photographic coverage of the north crater of the summit caldera.
2. The infrared data taken with the RS-14 scanner used during the NP3A flight were not usable because the surface brightness temperature was too high.
3. The laser profile data requested for the traverse across the summit area was not taken because solar reflectance in the laser wavelength was too high.

D. PROGRESS REPORT:

1. Accomplishments during reporting period:

- a. We have completed the organization and first look analysis of the data taken by the NASA NP3A aircraft - a total of about 2500 photographs and film product of the RS-14 IR scanner. These arrived on the last day of the first reporting period.
- b. We have completed first look analysis of ERTS images supplied to date. Preliminary results are discussed in the section on significant results.

2. Plans for next reporting period:

- a. We plan to continue analysis of the ERTS images - we will make use of the composite projector array which will soon be available to us.
- b. We plan to make prints of selected photos to enlarge and enhance the image of summit area on all photographs.

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13 Dec. 1972

Report

C.S. Benson

(Alaska Univ.,

College.)

(E72-10339) GLACIOLOGICAL AND
VOLCANOLOGICAL STUDIES ON THE WRANGELL
MOUNTAINS, ALASKA Bimonthly Progress
Report C.S. Benson (Alaska Univ.,
College.)

- c. The Wrangell Mountains have the most compact and continuous, high altitude set of glaciers in Alaska. They have been largely inaccessible for research purposes with exception of our study of the summit area on Mt. Wrangell itself. We plan to look at the entire glacier cover of the Wrangell Mountains to see if a full scale study of them can be undertaken based on the start obtained from ERTS. This effort will begin during the next reporting period.

E. SIGNIFICANT RESULTS:

(See attached sheet)

F. PUBLICATIONS:

None

G. RECOMMENDATIONS:

None

H. CHANGES IN STANDING ORDER FORMS:

None

I. ERTS IMAGE DESCRIPTIONS FORMS:

None

J. DATA REQUEST FORMS:

None

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DISCIPLINES: Mineral Resources, Geological Structure and Land Form
Surveys/Water Resources

SUBDISCIPLINES: Volcano surveys/glacier surveys

SUMMARY OF SIGNIFICANT RESULTS:

We are happy to report that it appears feasible to monitor changes of the summit area on Mt. Wrangell. Data from cycles 1, 2, 3 and 4 over the Wrangell Mountains indicate that the deposition of new snow from storms and its later melting by volcanic heat can be detected.

The image of 2 August (cycle 1) shows the summit area completely free of clouds. The east, west and north walls of the active crater are free of snow as are large areas on the rim of the north crater. On 18 August (cycle 1) high clouds, above 3000 m and moving from south to north, covered the summit area of Mt. Wrangell. Cloud cover on 19 August showed that a major storm was in progress. The 20 August image shows the summit area to be free from clouds, with new snow cover. Indeed, all of the bare rock patches which were visible on the 2 August image are snow covered. The crater rims are apparent only because of shadows caused by the topographic relief. The entire region inside the active crater was snow covered.

During cycle 3 the summit was clear on 7 September even though most of the photograph is cloud covered. Some bare rock is apparently exposed on the north wall of the active crater. Closer examination of this image will be attempted by photographic enlargement and enhancement. On 23 September the entire image was free from clouds. However, the low sun angle (27°) creates strong shadows and it is difficult to determine snow free areas in the active crater. Part of the rim of the north crater does appear to be snow free.

Snow can be removed from the areas on the summit mentioned above only through melting by volcanic heat. The results of this process can be observed in the ERTS images. Note that these results are based upon first-look analysis only. We expect in future to be able to increase the information extracted from the image by the use of enhancement techniques.